Information Technology and the Warfighter

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Why Are We Here?

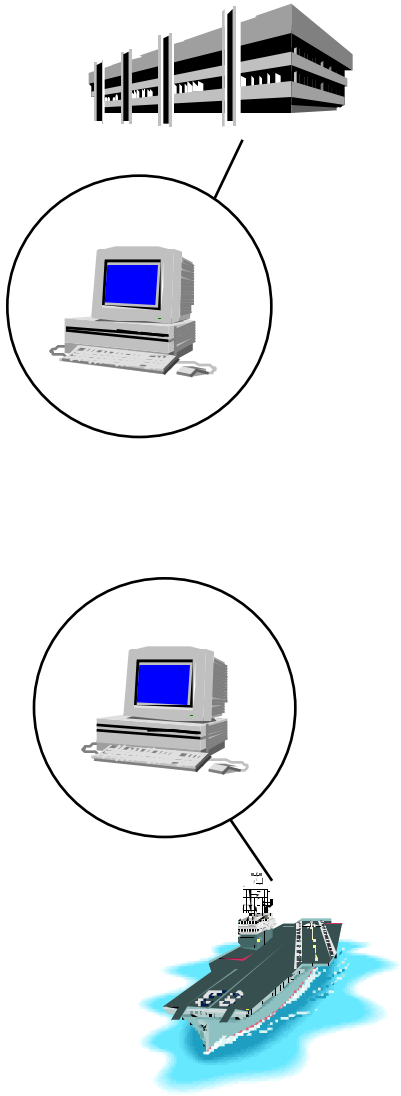
- What are Computer Networks and Why Do We Care?
  - Opportunities and Risks
- Does the DoN Need Computer Networks?
  - Why Not Use Internet?
- Can We Improve DoN Networking?
  - Security
  - Reliability
  - Performance
- What is the Networking Project Doing?
  - Plans and Status
- Challenges

What Are Computer Networks?
Why Do We Care?

Information Technology

Definitions

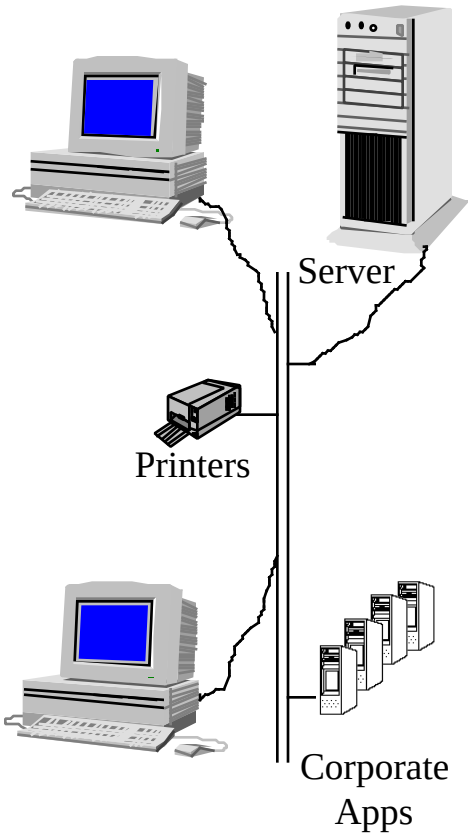
- Computer - general purpose device (function defined by software computer program)
- Operating System - specific software instructions that tells the computer how to perform
- Application Software - software that performs specific functions
  - C^2 Tactical Picture
  - Sensor Processing / Control
  - FITREPS
  - budgets
  - standard DoD/DoN forms
  - EMails



Information Technology continued...

Definitions

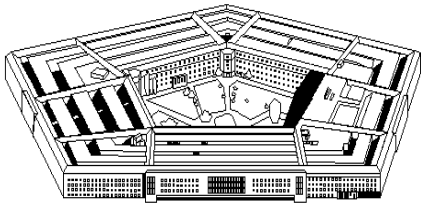
- Network - network is to data as telephone is to voice
  - infrastructure (wire, fiber, radio)
  - shared resources (printers, displays, databases)
- Server - separate “shared” computer on network
  - corporate applications
  - shared (stored) data files
- Corporate Applications - software programs which may affect many users
  - JMCIS / GCCS
  - Air Tasking Orders
  - Naval Consolidated Personnel Database System
  - STARS
  - EMail



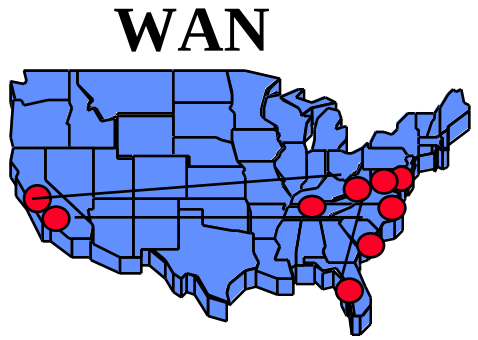
Information Technology continued...

Definitions

- **Local Area Network (LANs) - Physical data communication connections spanning a limited geographical area**
  - **Office or Building**



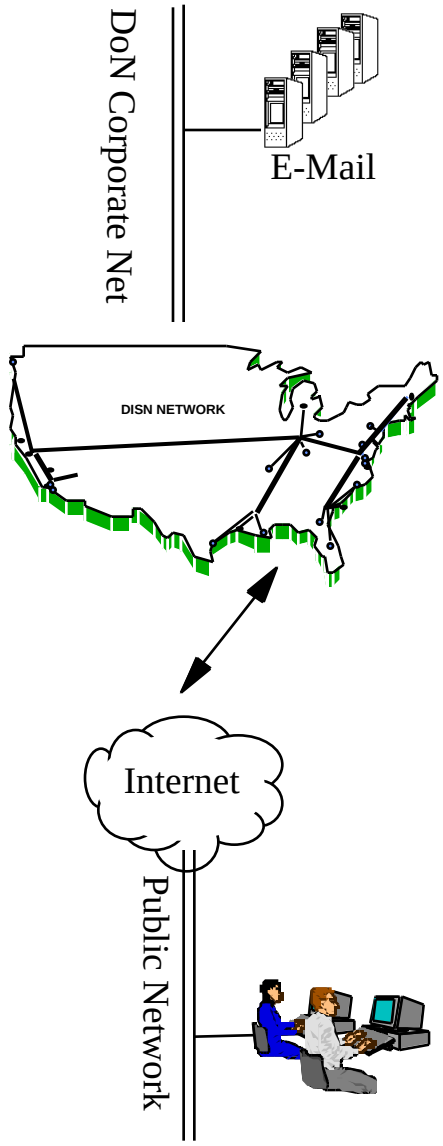
- **Wide Area Network (WANs) - Physical data communication connections designed connect multiple, geographically dispersed LANs**
  - **SPAWAR & NAVAIR WANs**



Information Technology continued...

Definitions

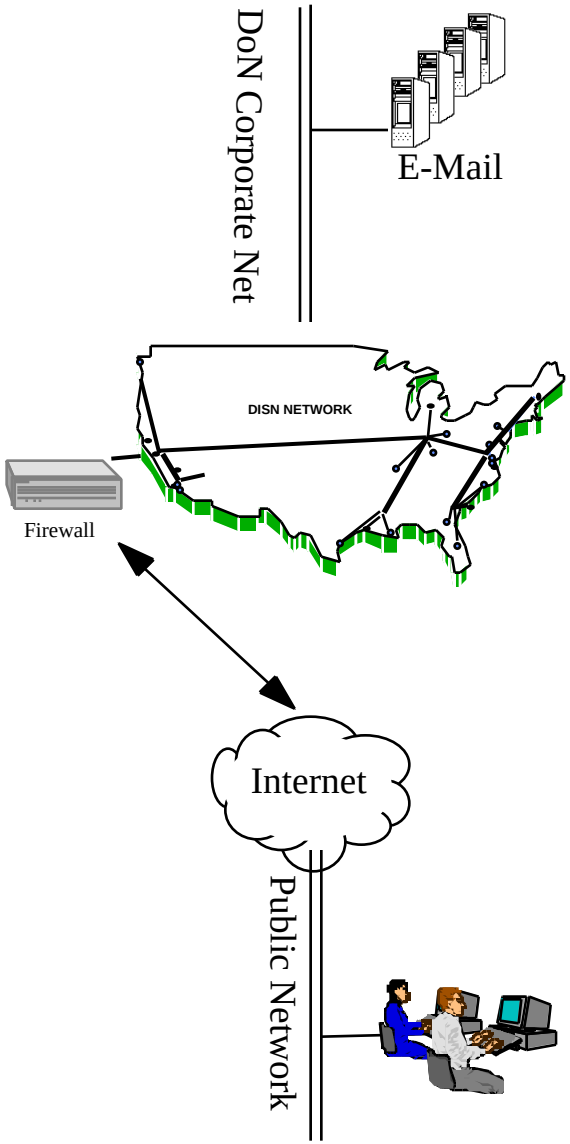
- **Corporate Network - organizational LANs/WANs, applications, information, and data**
  - **access provided only to organizational users**
- **Public Network - Nationwide WANs with "pay-as-you-go" access to anyone**
  - **Service provider (AT&T, Sprint, MCI, etc)**
  - **Monthly usage fees**
- **DISN - the Defense Information System Network that is the wide area information transfer network for support of military services**



Information Technology continued...

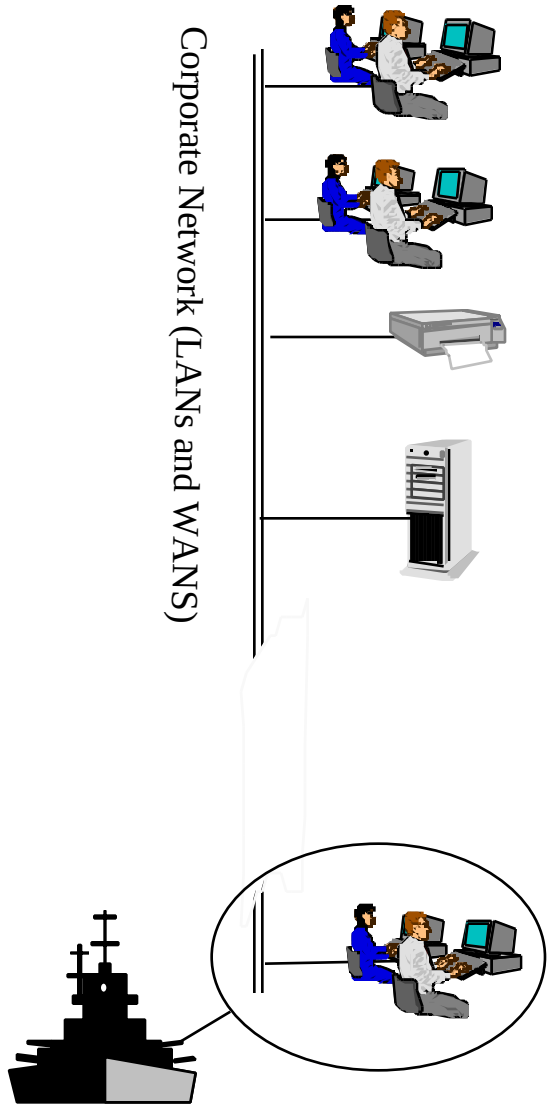
Definitions

- **Firewall - Security barrier between Corporate and Public Networks**
  - **prevent unauthorized access**
  - **filters or scrambles outbound traffic**
  - **filters or descrambles inbound traffic**
- **Internet - public computer networks that link commercial, educational, military and private users world-wide**
- **EMail - Part of an electronic messaging system that allows user to send / receive simple text messages via network**



Why Are Networks Important?

- Improve Communications
  - Exchange information any time...anywhere
  - Medium for work group tools (ATO planning, JTF course of action, BDA assessment)
- Improve Productivity
  - Allows use of Corporate business packages
    - reduce work load
    - streamline staffing
    - accurate, up-to-date information
    - reduce cycle times and paperwork
- New ways to work
  - Streamline processes
  - Multiplier in offsetting our mandated downsizing



How Does the Internet Work?

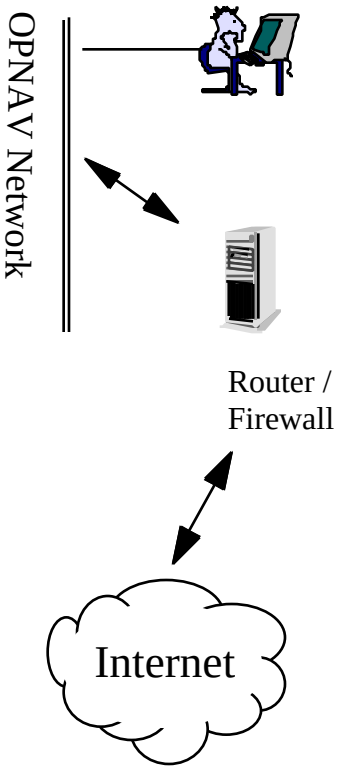
- **Internet Address consists of name of user and domain separated by the “@” sign**
  - **jboorda@opnav-emh.navy.mil**

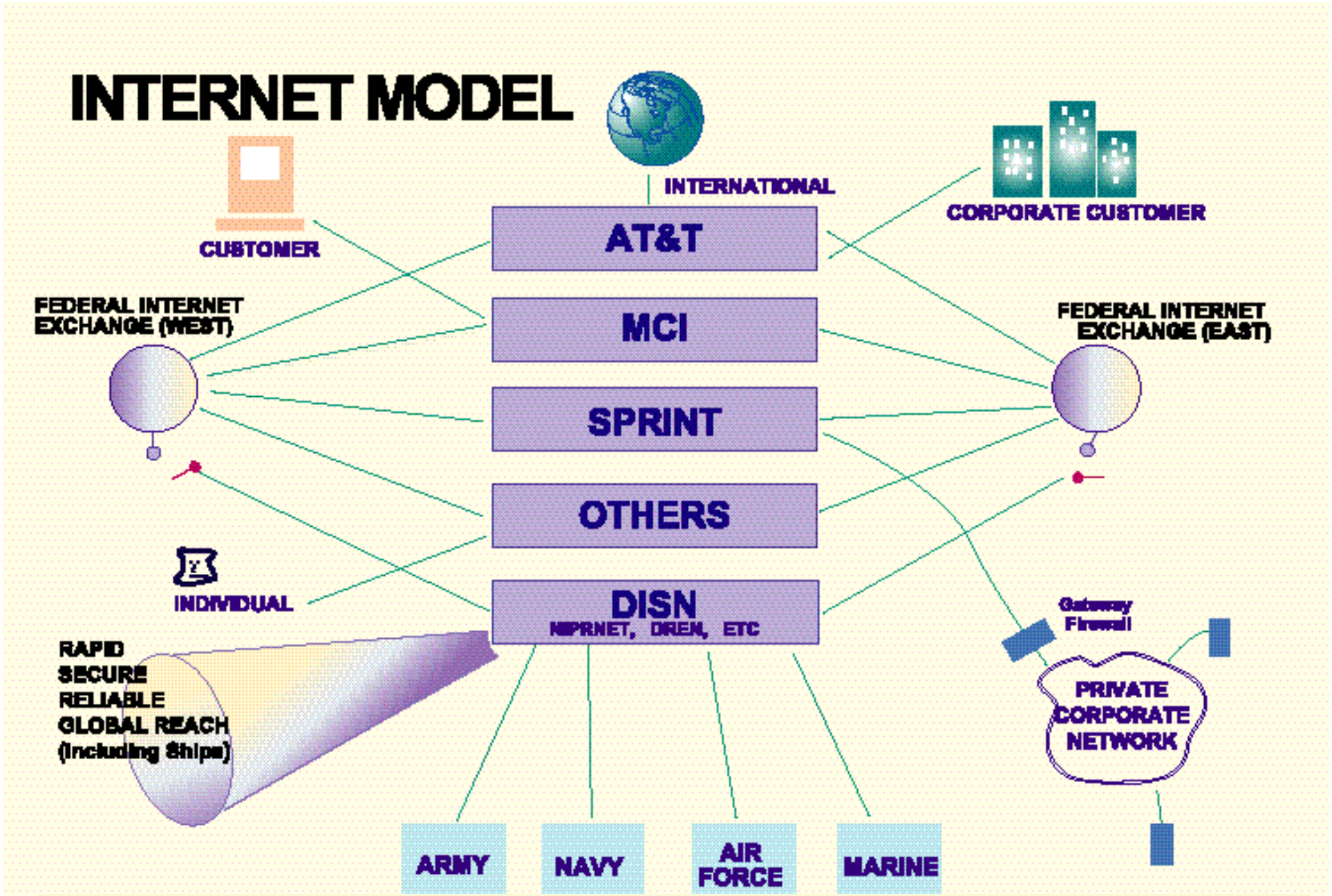
name of user machine

subdomain of navy

navy is subdomain of mil

mil is the domain (military)





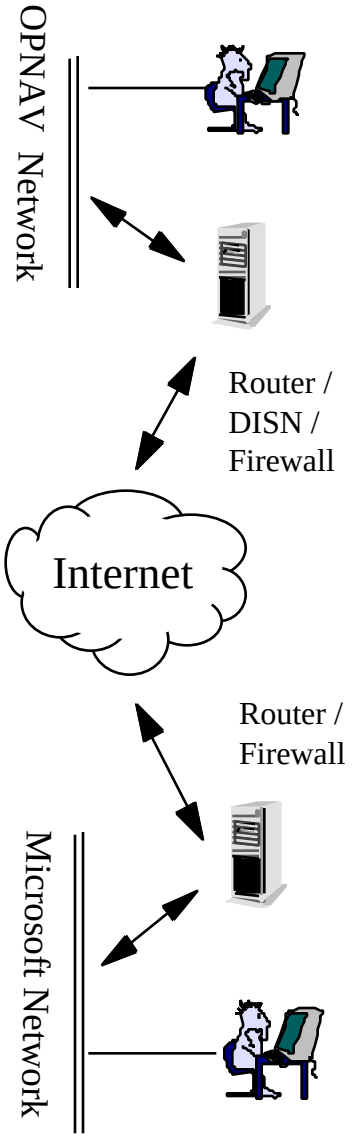
Networks Linked Together by the Common Carriers
At Federal Internet Exchanges (FIX)

CNO to Bill Gates EMail

From: jboorda@opnav-emh.navy.mil

To: bgates@microsoft.com

- **Mail software reads address and then routes**
  - **over the OPNAV LAN to Pentagon router**
  - **to the DISN network and firewall**
  - **out onto the Internet cloud (millions of possible routes)**
  - **into router and firewall at Microsoft**
  - **onto the Microsoft corporate LAN**
  - **into the communications server**
  - **and into the EMail account of Bill Gates**



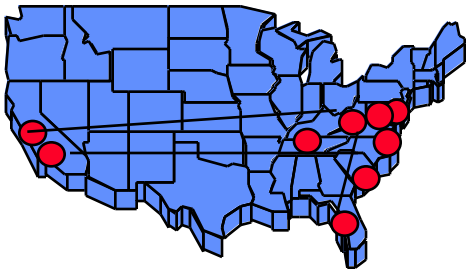
Why Does the DoN Need to be Concerned with Computer Networking?

Why a DoN Network?
Why Not Use Internet?

- **DoD standard communication strategy**
  - **Building the Defense Information Infrastructure**
  - **Defense Information System Network**
  - **Defense Messaging System**
- **The Train has left the station**
  - **The Copernicus architecture is the network**
  - **DoN wide, individual commands are investing in infrastructure**
  - **We need to lay tracks, not drive the train**

Defense Information System Network (DISN)

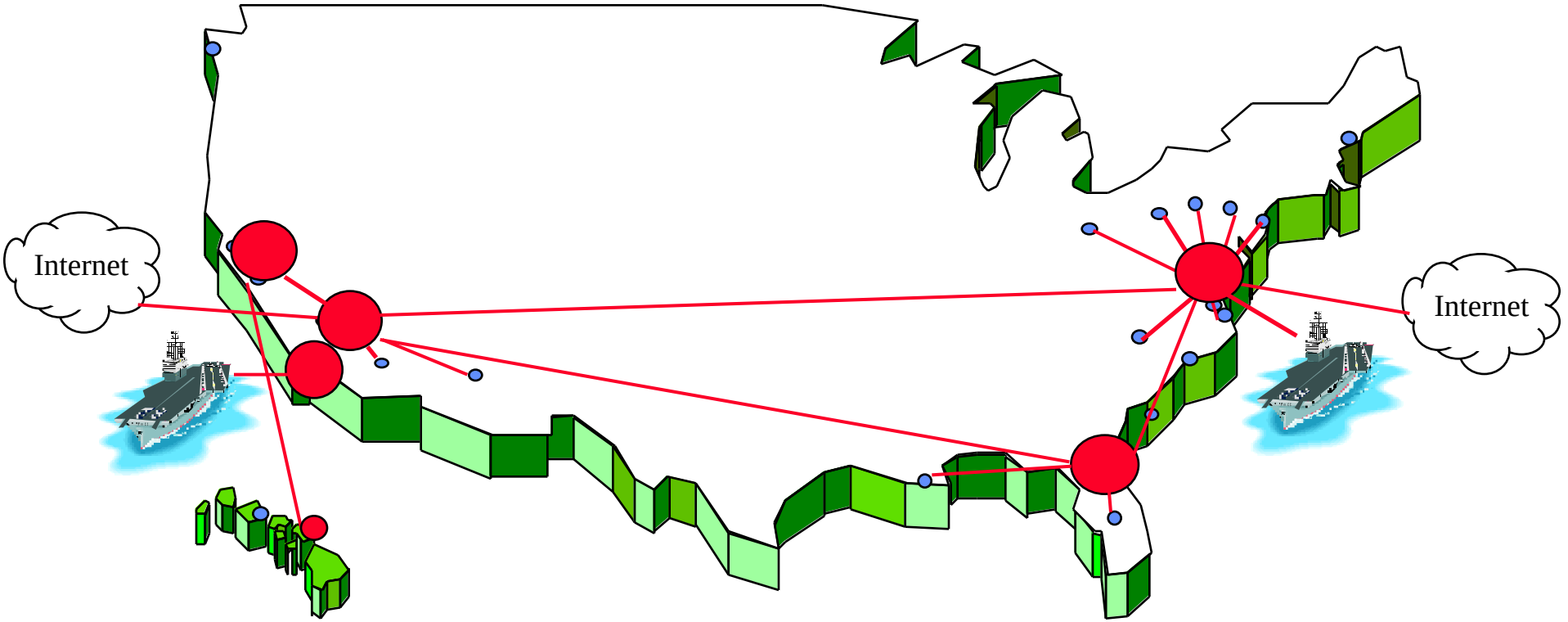
- DoD information backbone for voice, video, data
  - Replaced Defense Data Network, Defense Switched Network Jan 96
    - » NIPRNET (unclas traffic) and SIPRNET (secret traffic)
  - Support the DoD Global Command and Control System (GCCS) consolidation strategy
  - Reduces infrastructure support & operational costs
- Government-controlled (end-to-end)
- Being implementation by DISA and commercial activities
  - Fee for service based costing
  - Services must use DISN to connect networks



Use of Defense Message System (DMS)

- Standard DoD-wide global (record message traffic) messaging system
  - Tactical & Strategic, Ashore & Afloat
  - Built using COTS applications to support organizational and individual EMail
  - Multi Level Security & Authentication
  - Reliable & Survivable, Guaranteed Delivery
- Replaces AUTODIN
  - phase out from 1996 to 2000
- Services must implement beginning July 1996
  - 80% implementation by 2000
- Uses DISN (long haul network)

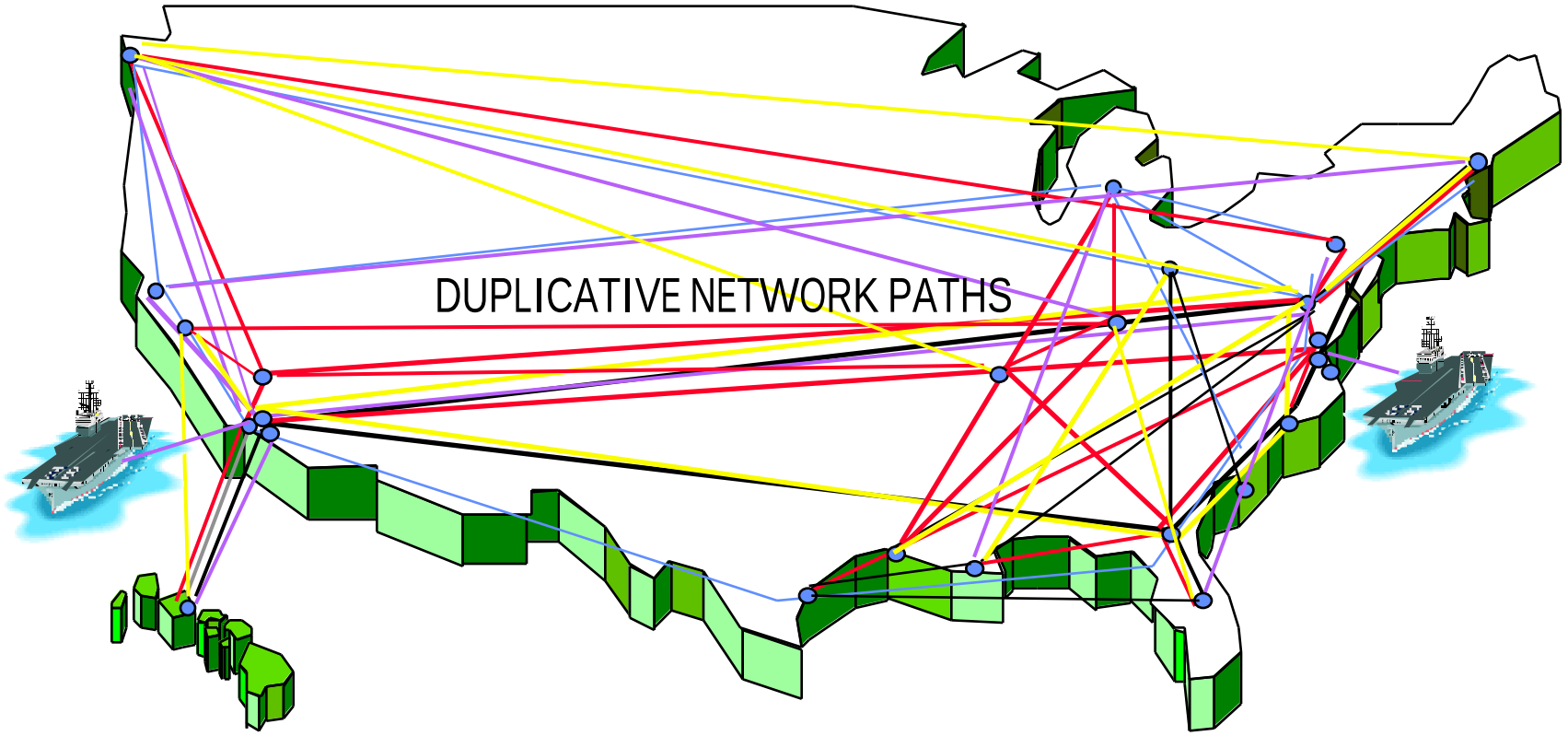
Currently Operating DoN Network
SPAWAR



Connection service purchased through commercial providers

Others include
- **TYCOMS**
- **NAVAIR**
- **NAVSEA**
- **BUMED**
- **USMC**

Taken Together, We Look Like This



Long Haul Networks Include:
56K, T1, T3

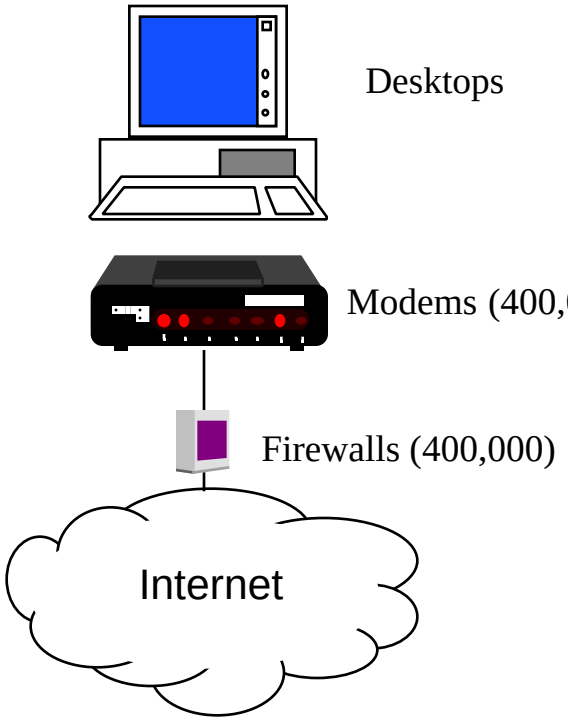
DoN LAN Infrastructure Investments

Activity	#PCs on LAN	Est Costs
LANTFLT	600	3,000,000.00
PACFLT	*600*	3,000,000.00
AIRLANT	2,200	11,000,000.00
AIRPAC	700	3,500,000.00
SECNAV	1,200	6,000,000.00
OPNAV	2,000	10,000,000.00
USMC	65,000	325,000,000.00
BUMED	6,900	34,500,000.00
BUPERS	1,400	7,000,000.00
NAVAIR	40,000	200,000,000.00
NAVFAC	500	2,500,000.00
NAVSEA	60,000	300,000,000.00
NAVSUP	17,000	85,000,000.00
SPAWAR	15,000	75,000,000.00
ONR	950	4,750,000.00
	214,050	1,067,250,000.00

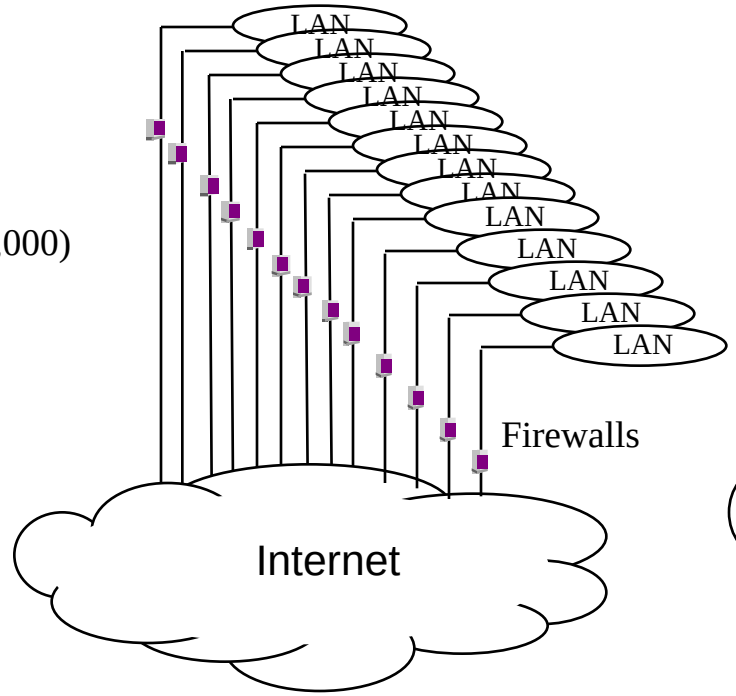
How Should We Use the Internet?

Connection Strategies

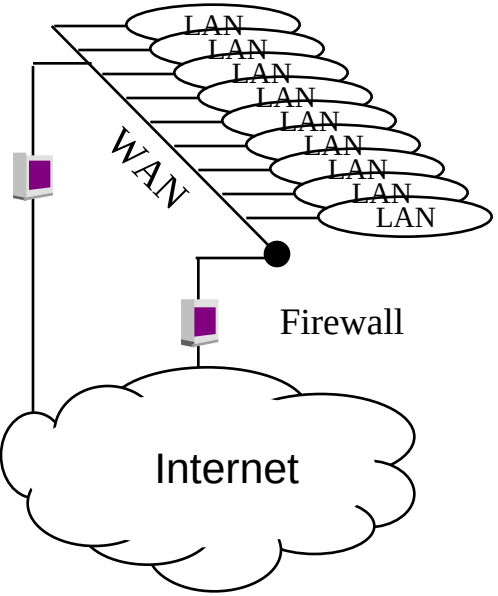
No Corporate Network



Multiple Corporate Networks



One Corporate Network



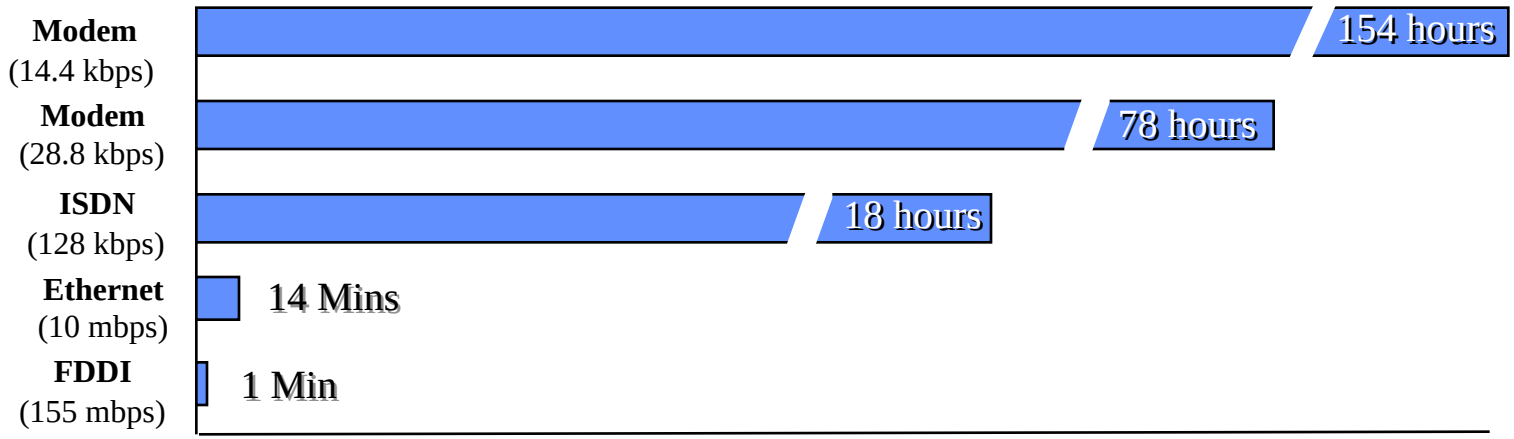
Internet Shortfalls - Security & Reliability

- **Security**
  - **Ability to penetrate through Internet is increasing**
    - » **Unauthorized intrusions via Internet in 1994 -- 2300 break-ins with 20% resulting in financial loss**
    - » **NSA estimates that we recognize less than 20% of intrusions**
  - **Reasons for break-ins**
    - » **Espionage, proprietary data, embarrassment, shut down**
- **Reliability**
  - **User authentication is not possible**
  - **Prevents “guaranteed” delivery (independent service providers)**
  - **No means to route messages on preferred networks**
  - **No prioritization**
  - **Transfer of complex files and graphics is difficult**

Internet Shortfalls - Capacity

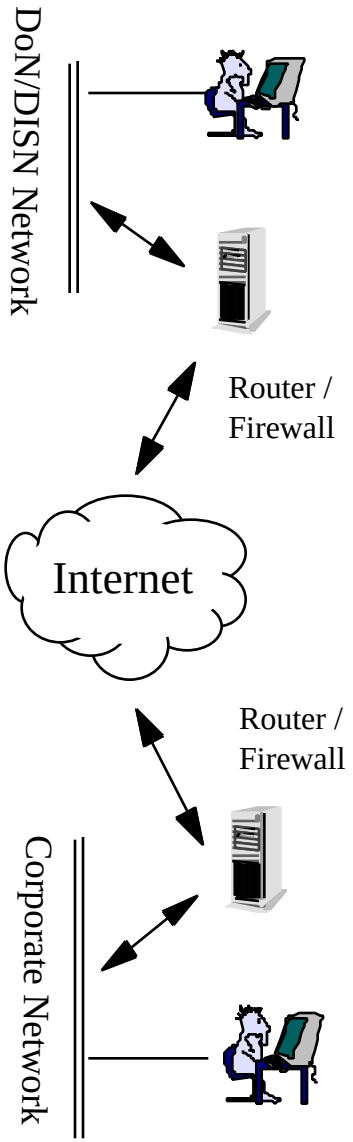
- **A simple EMail requires only small capacity network (size of pipe)**
  - **usually 14.4 or 28.8 kbps over telephone lines**
  - **service provider (MSN, AOL, Erols, etc) capacity is function of people on net**
- **DoN IT infrastructure needs 10 to 100 mbps to support its mission**
- **Performance is apparent when passing a complex image; ATO...**

Assumes 1 Gigabite file



Why We Need the Internet

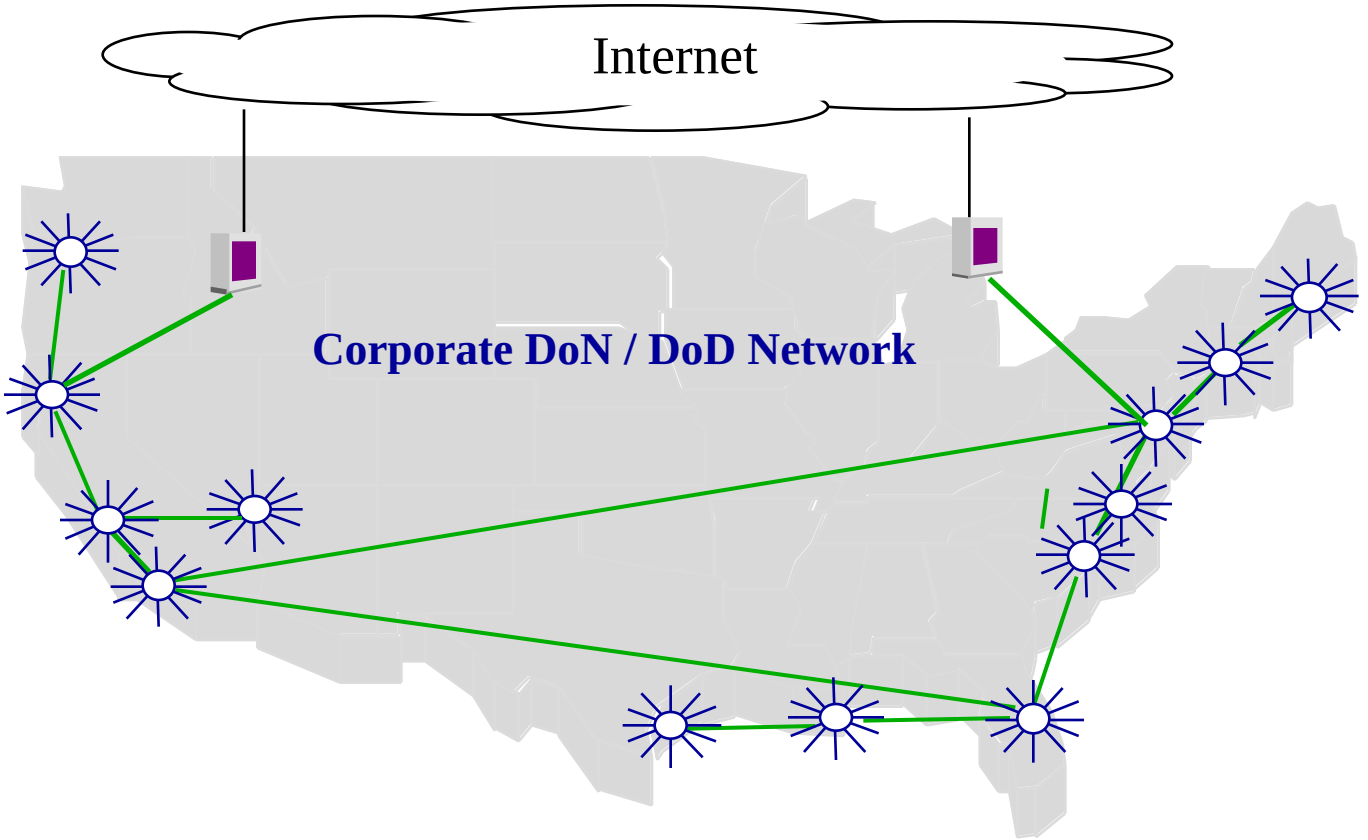
- **Communications path to industry partners and others outside our DoN corporate WAN**
- **Individual access to a wide range of information related to the DoN**
  - **Organizational**
    - » **Navy News**
    - » **Public Affairs information on the Internet**
    - » **Public domain speeches and white papers**
  - **Business**
    - » **Commerce Business Daily announcements**
    - » **Draft specifications**
  - **Career**
    - » **Personnel and training information**
    - » **Private EMail home while deployed**



How Can We Improve DoN Networking?

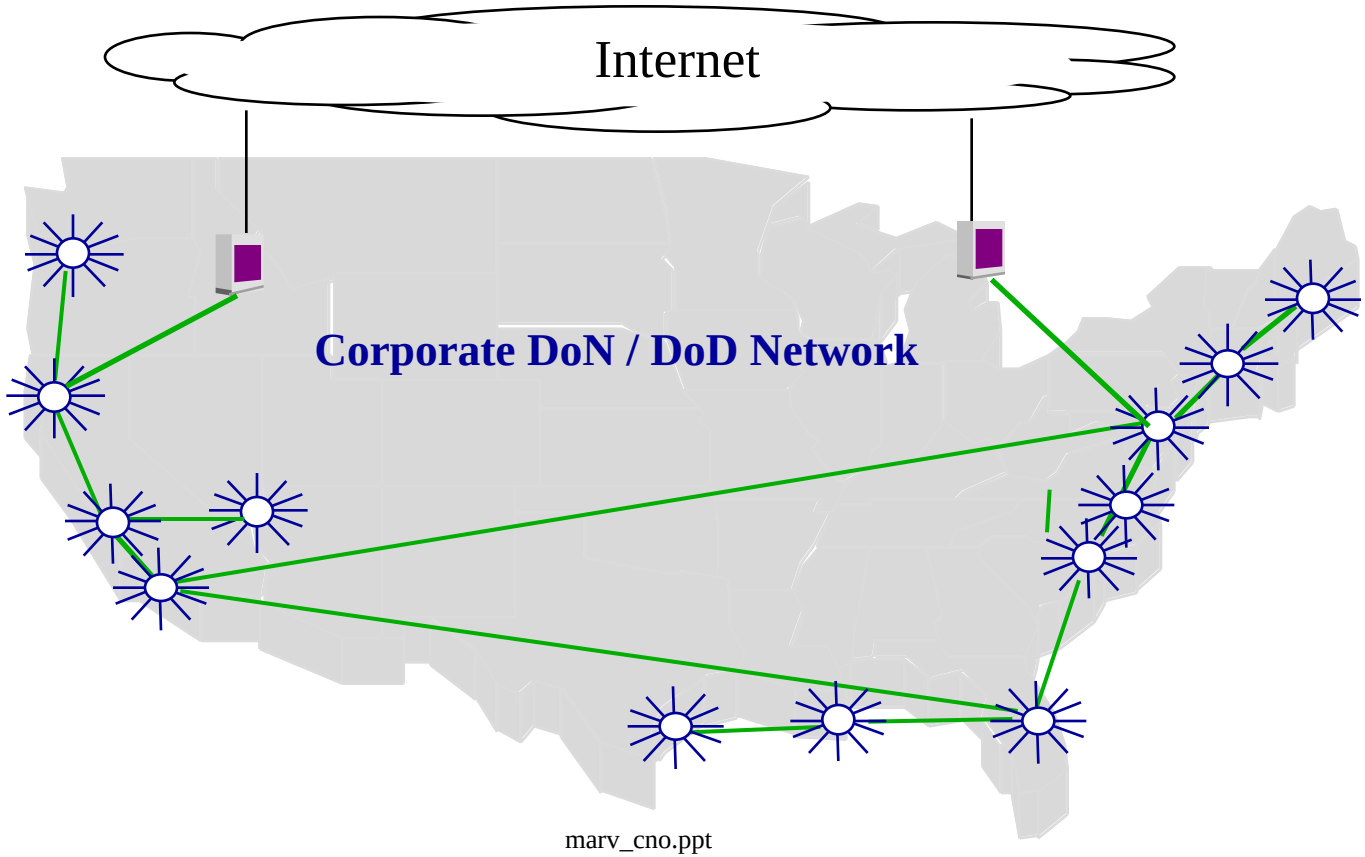
How Can We Improve Security

- **Minimize the number of points for intrusion**
- **Control data moving across access points**



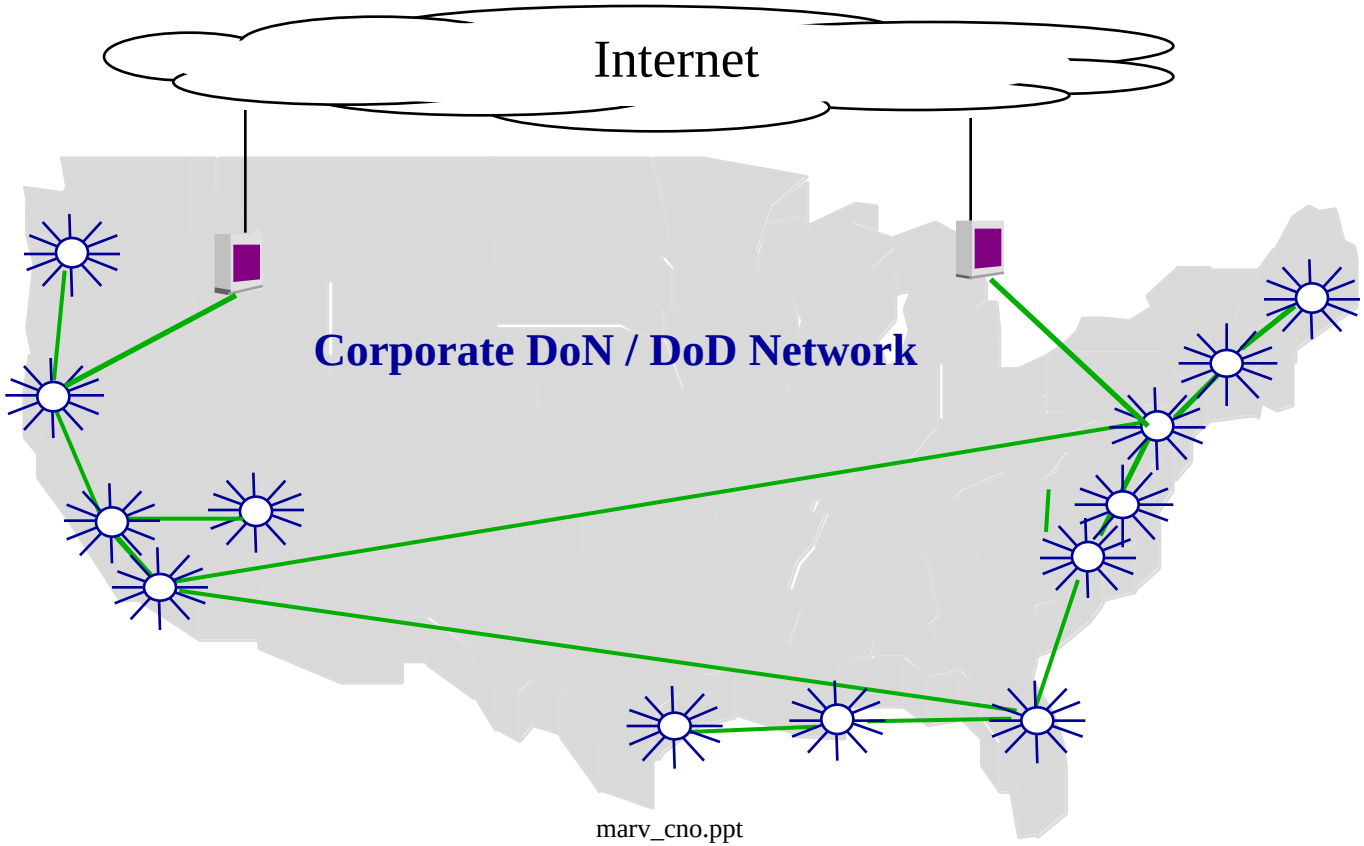
How Can We Improve Reliability

- **Network administration geared to military priorities**
- **Provides ability to ensure 100% delivery**
- **Reliability will support classified network**



How Can We Improve Performance

- **We can control capacity of DoN / DISN network**
- **WAN services provide much larger “pipe” (10 - 100MBS)**
- **Contributes DoN piece of DII to support technical, logistics & corporate users as well as all Fleet systems**



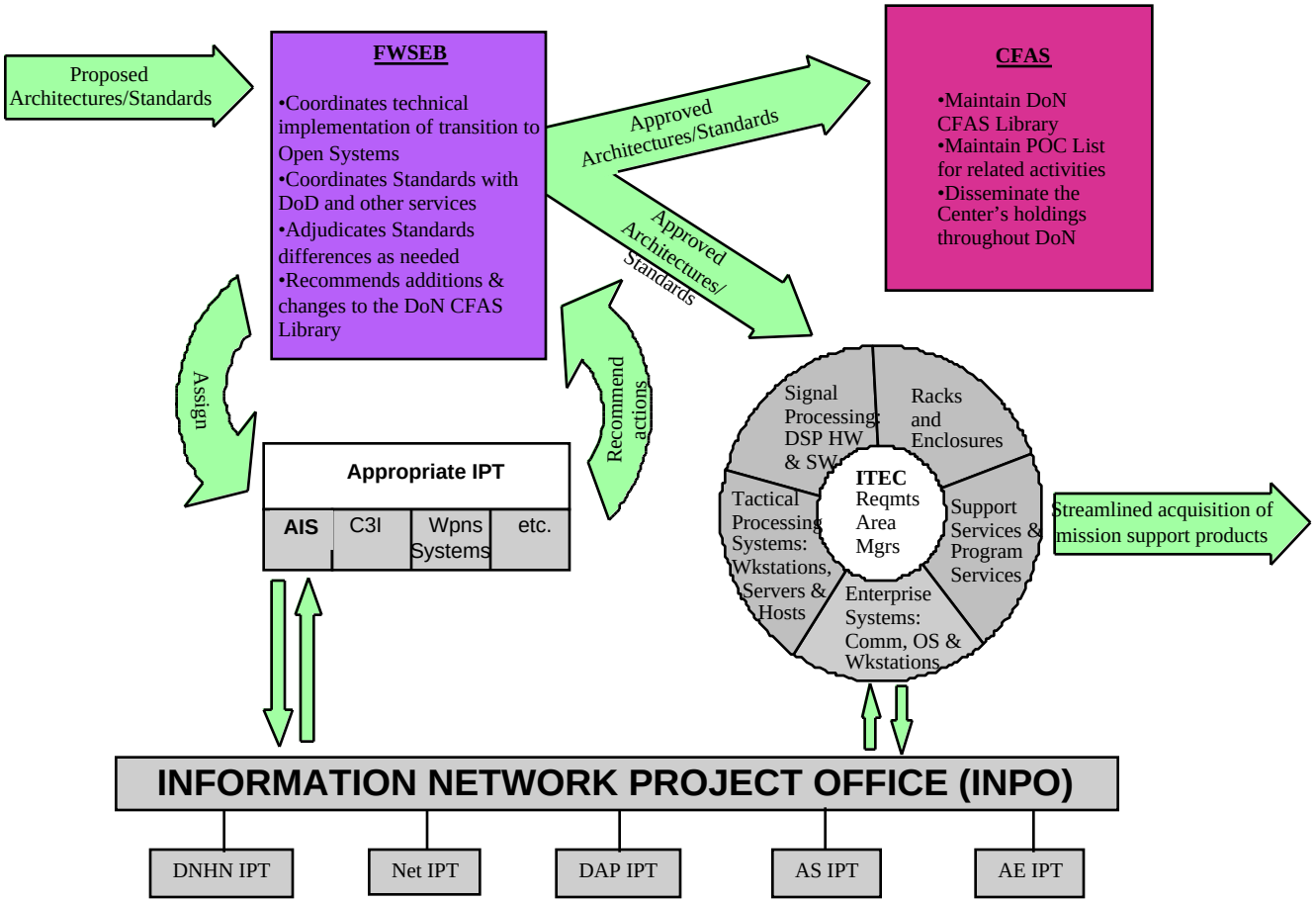
What is DoN C^4I Doing?

- **CFAS - Single DoN repository for all IT standards, publishes standards to the Fleet**
- **ITEC - Streamlined acquisition of IT in accordance with approved items**
- **DoN IM Conference - Focus IM efforts across DoN towards standards, interoperability and long-term strategies**
- **DMS/DISN Compliance - Consolidate DoN efforts to identify requirements and develop an orderly migration strategy**
- **INPO**
  - **Provide connection and interoperability to the existing Pentagon networks**
  - **Consolidate WAN hubs in DC area**

INPO Project

- **Charter**
  - **Unified SECNAV/OPNAV/MARCORPS LANs**
    - » **Classified**
    - » **Unclassified - NLT July 96**
  - **Central Navy Hub for Washington Area**
    - » **Ties in 7 major DC area LANs/WANs**
    - » **Facilitates DoN wide WAN / LAN**
    - » **Concept Supported by DoD Single Agency Manager**
  - **Facilitate support of DoD/DoN standards evolution and FWSEB**
    - » **Standards team members from across DoN**

Architecture and Standards Process



Challenges

- **People**
  - **Trained & Skilled Officers, enlisted and civilian personnel are in short supply**
  - **Those that have capability**
    - » **not readily promoted**
    - » **worth much to industry**
- **Budget**
  - **Dollars to support networks are not necessarily visible**
    - » **Inconsistent implementation, non-interoperable LANs**